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SERIES Y: GLOBAL INFORMATION
INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS
AND NEXT-GENERATION NETWORKS

Next Generation Networks – Frameworks and functional
architecture models

Terms and definitions for next generation networks

Recommendation ITU-T Y.2091



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Recommendation ITU-T Y.2091

Terms and definitions for next generation networks

Summary

Recommendation ITU-T Y.2091 contains terms and definitions and a framework relevant to providing a general understanding of next generation networks (NGNs) and a guide for the development of NGN documents including Recommendations in ITU.

History

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FOREWORD

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Recommendation ITU-T Y.2091

Terms and definitions for next generation networks

1 Scope

This Recommendation contains terms and definitions and a framework relevant to providing a general understanding of next generation networks and a guide for the development of NGN documents in the ITU.

This Recommendation is not simply a compendium of terms and definitions. The primary purpose of this Recommendation is to provide a context for the use of certain terms and definitions to avoid misunderstandings in NGN activities. Thus, the definitions are arranged in a specific order and certain necessary relationships are illustrated. Additionally, explanatory notes are also included where deemed appropriate.

This Recommendation uses terms and definitions, which are considered particularly suitable and applicable to NGN work and that have already been defined in published ITU-T Recommendations. Additionally, where new terms were required they have been defined in this Recommendation.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

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|-----------------|--|
| [ITU-T E.107] | Recommendation ITU-T E.107 (2007), <i>Emergency Telecommunications Service (ETS) and interconnection framework for national implementations of ETS.</i> |
| [ITU-T E.164] | Recommendation ITU-T E.164 (2005), <i>The international public telecommunication numbering plan.</i> |
| [ITU-T G.722] | Recommendation ITU-T G.722 (1988), <i>7 kHz audio-coding within 64 kbit/s.</i> |
| [ITU-T G.805] | Recommendation ITU-T G.805 (2000), <i>Generic functional architecture of transport networks.</i> |
| [ITU-T G.809] | Recommendation ITU-T G.809 (2003), <i>Functional architecture of connectionless layer networks.</i> |
| [ITU-T G.902] | Recommendation ITU-T G.902 (1995), <i>Framework Recommendation on functional access networks (AN) – Architecture and functions, access types, management and service node aspects.</i> |
| [ITU-T G.993.1] | Recommendation ITU-T G.993.1 (2004), <i>Very high speed digital subscriber line transceivers (VDSL).</i> |
| [ITU-T G.8081] | Recommendation ITU-T G.8081/Y.1353 (2010), <i>Terms and definitions for Automatically Switched Optical Networks (ASON).</i> |
| [ITU-T H.248.1] | Recommendation ITU-T H.248.1 (2005), <i>Gateway control protocol: Version 3.</i> |

[ITU-T M.3050.1]	Recommendation ITU-T M.3050.1 (2007), <i>Enhanced Telecom Operations Map (eTOM) – The business process framework</i> .
[ITU-T Q.825]	Recommendation ITU-T Q.825 (1998), <i>Specification of TMN applications at the Q3 interface: Call detail recording</i> .
[ITU-T Q.1703]	Recommendation ITU-T Q.1703 (2004), <i>Service and network capabilities framework of network aspects for systems beyond IMT-2000</i> .
[ITU-T Q.1706]	Recommendation ITU-T Q.1706/Y.2801 (2006), <i>Mobility management requirements for NGN</i> .
[ITU-T Q.1741.1]	Recommendation ITU-T Q.1741.1 (2002), <i>IMT-2000 references to release 1999 of GSM evolved UMTS core network with UTRAN access network</i> .
[ITU-T Q.1741.6]	Recommendation ITU-T Q.1741.6 (2009), <i>IMT-2000 references to Release 8 of GSM-evolved UMTS core network</i> .
[ITU-T Q.1742.1]	Recommendation ITU-T Q.1742.1 (2002), <i>IMT-2000 references to ANSI-41 evolved core network with cdma2000 access network</i> .
[ITU-T Q.1761]	Recommendation ITU-T Q.1761 (2004), <i>Principles and requirements for convergence of fixed and existing IMT-2000 systems</i> .
[ITU-T Q.1762]	Recommendation ITU-T Q.1762/Y.2802 (2007), <i>Fixed-mobile convergence general requirements</i> .
[ITU-T T.120]	Recommendation ITU-T T.120 (2007), <i>Data protocols for multimedia conferencing</i> .
[ITU-T T.137]	Recommendation ITU-T T.137 (2000), <i>Virtual meeting room management for multimedia conferencing audio-visual control</i> .
[ITU-T X.200]	Recommendation ITU-T X.200 (1994) ISO/IEC 7498-1:1994, <i>Information technology – Open Systems Interconnection – Basic Reference Model: The basic model</i> .
[ITU-T X.462]	Recommendation ITU-T X.462 (1996) ISO/IEC 11588-3:1997, <i>Information technology – Message Handling Systems (MHS) Management: Logging information</i> .
[ITU-T X.601]	Recommendation ITU-T X.601 (2000), <i>Multi-peer communications framework</i> .
[ITU-T X.603]	Recommendation ITU-T X.603 (2004) ISO/IEC 16512-1:2005, <i>Information technology – Relayed multicast protocol: Framework</i> .
[ITU-T X.800]	Recommendation ITU-T X.800 (1991), <i>Security architecture for Open Systems Interconnection for CCITT applications</i> .
[ITU-T X.811]	Recommendation ITU-T X.811 (1995) ISO/IEC 10181-2:1996, <i>Information technology – Open Systems Interconnection – Security frameworks for open systems: Authentication framework</i> .
[ITU-T Y.101]	Recommendation ITU-T Y.101 (2000), <i>Global Information Infrastructure terminology: Terms and definitions</i> .
[ITU-T Y.110]	Recommendation ITU-T Y.110 (1998), <i>Global Information Infrastructure principles and framework architecture</i> .
[ITU-T Y.1001]	Recommendation ITU-T Y.1001 (2000), <i>IP framework – A framework for convergence of telecommunications network and IP network technologies</i> .

[ITU-T Y.1411]	Recommendation ITU-T Y.1411 (2003), <i>ATM-MPLS network interworking – Cell mode user plane interworking.</i>
[ITU-T Y.2001]	Recommendation ITU-T Y.2001 (2004), <i>General overview of NGN.</i>
[ITU-T Y.2002]	Recommendation ITU-T Y.2002 (2009), <i>Overview of ubiquitous networking and of its support in NGN.</i>
[ITU-T Y.2011]	Recommendation ITU-T Y.2011 (2004), <i>General principles and general reference model for next generation networks.</i>
[ITU-T Y.2012]	Recommendation ITU-T Y.2012 (2006), <i>Functional requirements and architecture of the NGN release 1.</i>
[ITU-T Y.2015]	Recommendation ITU-T Y.2015 (2009), <i>General requirements for ID/locator separation in NGN.</i>
[ITU-T Y.2017]	Recommendation ITU-T Y.2017 (2009), <i>Multicast functions in next generation networks.</i>
[ITU-T Y.2018]	Recommendation ITU-T Y.2018 (2009), <i>Mobility management and control framework and architecture within the NGN transport stratum.</i>
[ITU-T Y.2021]	Recommendation ITU-T Y.2021 (2006), <i>IMS for Next Generation Networks.</i>
[ITU-T Y.2031]	Recommendation ITU-T Y.2031 (2006), <i>PSTN/ISDN emulation architecture.</i>
[ITU-T Y.2111]	Recommendation ITU-T Y.2111 (2006), <i>Resource and admission control functions in Next Generation Networks.</i>
[ITU-T Y.2171]	Recommendation ITU-T Y.2171 (2006), <i>Admission control priority levels in Next Generation Networks.</i>
[ITU-T Y.2201]	Recommendation ITU-T Y.2201 (2009), <i>Requirements and capabilities for ITU-T NGN.</i>
[ITU-T Y.2205]	Recommendation ITU-T Y.2205 (2008), <i>Next Generation Networks – Emergency telecommunications – Technical considerations.</i>
[ITU-T Y.2236]	Recommendation ITU-T Y.2236 (2009), <i>Framework for NGN support of multicast-based services.</i>
[ITU-T Y.2261]	Recommendation ITU-T Y.2261 (2006), <i>PSTN/ISDN evolution to NGN.</i>
[ITU-T Y.2262]	Recommendation ITU-T Y.2262 (2006), <i>PSTN/ISDN emulation and simulation.</i>
[ITU-T Y.2271]	Recommendation ITU-T Y.2271 (2006), <i>Call server-based PSTN/ISDN emulation.</i>
[ITU-T Y.2601]	Recommendation ITU-T Y.2601 (2006), <i>Fundamental characteristics and requirements of future packet based networks.</i>
[ITU-T Y.2611]	Recommendation ITU-T Y.2611 (2006), <i>High-level architecture of future packet-based networks.</i>
[ITU-T Y.2701]	Recommendation ITU-T Y.2701 (2007), <i>Security requirements for NGN release 1.</i>
[ITU-T Y.2703]	Recommendation ITU-T Y.2703 (2009), <i>The application of AAA service in NGN.</i>

- [ITU-T Y.2720] Recommendation ITU-T Y.2720 (2009), *NGN identity management framework*.
- [ITU-T Y.2807] Recommendation ITU-T Y.2807 (2009), *MPLS-based mobility capabilities in NGN*.
- [ITU-T Z.100 Sup.1] Recommendation ITU-T Z.100 Supplement 1 (1997), *SDL + methodology: Use of MSC and SDL (with ASN.1)*.

3 Fundamental NGN definitions

The following three definitions define the fundamental nature of an NGN.

next generation network (NGN) [ITU-T Y.2001]: A packet-based network able to provide telecommunication¹ services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies. It enables unfettered access for users to networks and to competing service providers and/or services of their choice. It supports generalized mobility which will allow consistent and ubiquitous provision of services to users.

NGN service stratum [ITU-T Y.2011]: That part of the NGN which provides the user functions that transfer service-related data and the functions that control and manage service resources and network services to enable user services and applications.

NGN transport stratum [ITU-T Y.2011]: That part of the NGN which provides the user functions that transfer data and the functions that control and manage transport resources to carry such data between terminating entities.

Visual representation of the relationship between these definitions is shown in Figure 1:

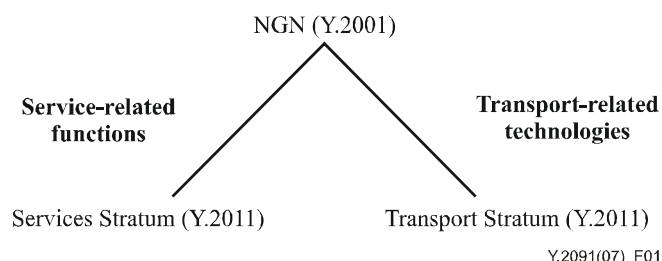


Figure 1 – Defined fundamental components of an NGN

4 Modes of communication for NGN

The layering principles of [ITU-T X.200], *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model*, apply.

In this respect, any (N)-layer may offer a connection-mode service, a connectionless-mode service, or both, to the (N+1)-layer, using the service or services provided by the (N–1)-layer.

4.1 Connection-mode service [ITU-T X.200]

A connection is an association established for the transfer of data between two or more peer-(N)-entities. This association binds the peer-(N)-entities together with the (N–1)-entities in the next lower layer. The ability to establish and release a connection and to transfer data over it is provided

¹ Telecommunication as defined in the ITU Constitution provision 1012 and in the International Telecommunication Regulations (ITR): Any transmission, emission or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems.

to the (N)-entities in a given (N)-layer by the next lower layer as a connection-mode service. The use of a connection-mode service by peer-(N)-entities proceeds through three distinct phases:

- a) connection establishment;
- b) data transfer; and
- c) connection release.

4.2 Connectionless-mode service [ITU-T X.200]

Connectionless-mode transmission is the transmission of a single unit of data from a source service-access-point to one or more destination service-access-points without establishing a connection. A connectionless-mode service allows an entity to initiate such a transmission by the performance of a single service access.

5 Transport stratum for NGN

Transport stratum has both vertically layered and horizontal dimensions.

5.1 Vertical aspects

The following terms and definitions of [ITU-T G.805] apply to the vertical layering principles for "connection-mode" operation.

5.1.1 Connection-mode

client/server relationship [ITU-T G.805]: The association between layer networks that is performed by an "adaptation" function to allow the link connection in the client layer network to be supported by a trail in the server layer network.

connection [ITU-T G.805]: A "transport entity" which consists of an associated pair of "unidirectional connections" capable of simultaneously transferring information in opposite directions between their respective inputs and outputs.

layer network [ITU-T G.805]: A "topological component" that represents the complete set of access groups of the same type which may be associated for the purpose of transferring information.

path layer network [ITU-T G.805]: A "layer network" which is independent of the transmission media and which is concerned with the transfer of information between path layer network "access points".

trail [ITU-T G.805]: A "transport entity" which consists of an associated pair of "unidirectional trails" capable of simultaneously transferring information in opposite directions between their respective inputs and outputs.

NOTE 1 – This could be regarded as a "connection" trail to distinguish it from the "connectionless trail" defined in [ITU-T G.809].

transmission media layer network [ITU-T G.805]: A "layer network" which may be media dependent and which is concerned with the transfer of information between transmission media layer network "access points" in support of one or more "path layer networks".

transport [ITU-T G.805]: The functional process of transferring information between different locations.

transport entity [ITU-T G.805]: An architectural component which transfers information between its inputs and outputs within a layer network.

transport network [ITU-T G.805]: The functional resources of the network which conveys user information between locations.

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